ALTERNATE DEPOSITION OF RAUHREIF AND RAUHEIS.

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The accompanying photograph shows what seems to have been alternating deposits of rime (Rauhreif) and rauheis on a twig of a bush growing at the Mount Weather (Va.) station; altitude, 1,725 feet.

This formation occurred on trees and shrubs during the night of February 19–20, 1914, at Mount Weather, Va. There was light fog during the forenoon of the 19th until 11:15 a. m. At this time the fog became dense, and by noon the temperature had fallen from 43°F. to freezing. Two one-hundredths of an inch of rain fell between 8 a. m. and 8 p. m., but the frozen formation on trees or shrubs did not begin until the air temperature had fallen below 30°F., about 9 p. m. At this time it is likely that twigs and blades of grass had cooled to well below 32°F. The temperature continued to fall during the night, reaching a minimum of 16°F., and the fog became light. A trace of precipitation is recorded for the period 8 p. m. of the 19th to 8 a. m. of the 20th. The wind during this period was blowing from the north at 17 miles per hour.

The fogs experienced at Mount Weather are really low clouds, and the variations in their density are merely the passing of "thinner" and "thicker," less and more dense, parts of the cloud layer. In the "thinner" parts of the cloud layer it often happens that the relative humidity may be somewhat below 100 per cent—i. e., that evaporation of the cloud or fog particles may, within certain limits, be taking place. A person walking in such a fog does not get wet. In the "thicker" part of the cloud the particles or droplets seem to be of larger size; condensation rather than evaporation is taking place, and one out in such a fog may get quite wet. Enough water may collect in a raingage during such fogs to warrant the observer's recording a trace of precipitation. When the smaller fog particles driven by the wind come in contact with a twig or blade of grass, cooled to below freezing, the surface film is broken and, because of its small extent, the water contained in the particle crystallizes immediately and adheres to the twig as a white-frost work, building out to the windward. When the larger fog particles strike the twig and the surface film of the droplet is broken, the water spreads out on the twig before it freezes as clear ice. It need not be supposed that the surface film of the droplet is broken by the force with which the latter hits the twig. There is probably an electric effect operative as the droplet approaches the twig which weakens the surface film. The temperature of the twig and the surrounding air doubtless determines the limiting size of the droplet that will freeze in crystalline form (rime) and the size at which the amorphous formation (rauheis) begins. This limiting size is probably larger at lower temperatures.

The formation illustrated by the photograph, figure 1, took place in four or five hours and seems to show that the passing cloud varied in density, the droplets forming it being at first smaller than the limiting size mentioned, then, successively, larger, smaller, larger and smaller than this size during the formation.

AMMONIA IN DEW.[1]

Mr. F. E. Gurney, of Ridgewell, Halstead, Essex, Britain, collected some samples of dew in 1914 which he had analyzed by Mr. J. W. Tayleur. The samples were collected on glass plates 12 inches square, exposed 1 foot above the ground over grassland in fine weather from September 23 to December 6, 1914, and within one hour of sunrise. Mr. Tayleur, the analyst, found these samples to contain no nitrates, traces of chlorides, and a comparatively large proportion of ammonia, viz, 7.5 and 5 parts by weight in 1,000,000, respectively. These figures may be compared with those given by Dr. W. J. Russell,[2] who found that the proportion of ammonia in dew collected in London in fine weather in winter was 3.4, in dull weather was 5.5, and in foggy weather was 11.0 parts per million. Dr. Russell also analyzed samples from Hackney and Dartmoor and found for the proportion of ammonia 4.0 and 0.3 per million, respectively.

The proportion of ammonia in rainwater is comparable with that in dew. According to the first report of the Committee for the Investigation of Atmospheric Pollution (App. I.), the proportion of ammonia in rainwater was 0.25 part per million at Malvern, about 0.7 at suburban stations, and from 1 to 7 parts per million in the large towns during the winter of 1914–15.

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[1] *Great Britain.* Meteorological Office circular, No. 7. Dec. 20, 1916. p. 4.

[2] *Great Britain. Meteorological Office.* Monthly weather report . . . for 1885 Appendix I: On the impurities in London air, by W. J. Russell, Ph. D., F. R. S. London, 1886. 4°. (Official, No. 65. Issue for Aug., 1885.) Dew is discussed on pp. (5)–(10).